The Effect of Timely Loan Loss Recognition in the Banking System on Firms' Debt Structure

Abstract

In this paper, we examine how the system under which banks record loan losses, specifically, the timeliness of loan loss recognition, affects borrowers' debt structure. Using data from 55 countries, we find that more timely loan loss recognition reduces firms' reliance on bank debt relative to public debt. This result reflects an equilibrium in which firms in an economy rely less on bank debt when there are greater lending constraints and more borrower monitoring in a more timely loan loss accounting regime. Consistent with such a regime resulting in tighter loan conditions, we find an even lower use of bank debt in countries with stringent bank supervision and among financially constrained and opaque firms. Overall, our study offers new insight into the real effects of banks' accounting on firms' debt structure when firms can choose alternative debt providers.

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1. Introduction

Understanding firms' debt structure is critical since, in many countries, debt financing is a firm's primary source of funds.[1] A better understanding of debt structure is also important since firms experience significant changes in their debt composition from one year to the next while showing no changes in their total leverage (Rauh and Sufi, 2010). Prior papers on debt structure mainly focus on the US market and on how borrower characteristics (e.g., credit quality, disclosure, and ownership structure) affect the borrower's debt structure (Denis and Mihov, 2003; Li et al., 2018; Boubakri and Saffar, 2018). To the best of our knowledge, no study has examined how the regulatory reporting mechanisms within the banking system can affect borrowers' debt structure. There is recent academic and practitioner interest in the timeliness with which banks report their losses but the literature, which tends to focus on lender outcomes, generally concludes that more timely loan loss provisioning can lead to a better financial system (Beatty and Liao, 2014; Bushman, 2014; Acharya and Ryan, 2016). In this paper, we rely on the significant heterogeneity in loan loss recognition in banking systems across countries and examine how the timeliness with which banks record loan losses can affect borrowers' debt structure.

We expect borrowers to rely less on bank debt in banking systems with greater loan loss recognition timeliness because tighter loan conditions lead to a decrease in loan demand and supply. From the loan supply perspective, timely loan loss recognition could decrease the supply of bank loans because of regulatory capital reduction that constrains lending. Timely loan loss recognition could also attract earlier scrutiny by regulators and other stakeholders of potential bank problems. As a result, banks are likely to exercise greater prudence, including

[1] According to *BIS Quarterly Review*, by the end of September 2016, the total debt securities issuance (including both public debt and private bond) worldwide was $94.5 trillion. Net debt issuance before September 2016 reached its highest level since 2009. Of this total, international bank lending reached $28.4 trillion and international debt securities issuance reached $1.4 trillion. See the statistics in *BIS Quarterly Review,* December 2016, "Highlights of global financial flows" at: http://www.bis.org/publ/qtrpdf/r_qt1612b.htm.

more stringent monitoring, especially when making risky loans (Beatty and Liao, 2014). From the loan demand perspective, increased bank monitoring from more timely loan loss recognition could decrease the demand for bank loans if borrowers choose to avoid costly monitoring by lenders. In particular, pre-contracting vetting of borrowers and stringent loan terms, as well as intense post-contracting monitoring and harsh actions by lenders can be costly to a borrower (Pennacchi, 1988; Datta, Iskandar-Datta, and Patel, 1999; Besanko and Kanatas, 2015). Hence, more costly monitoring under a more timely loan loss accounting regime can drive firms away from bank debt and towards other debt sources.[2]

To study the relation between loan loss recognition timeless and debt structure, we examine the debt structure of a large sample of public firms by taking advantage of a new database available through Capital IQ. Using firms from 55 countries, we examine how timely loan loss recognition in the banking system affects firms' debt structure. Following prior literature, we use the proportion of bank debt to total debt to measure borrowers' reliance on the former (e.g., Lin et al., 2013; Boubaker et al., 2017; Boubakri and Saffar, 2018). We find that more timely loan loss recognition is associated with a reduced reliance on bank debt, after controlling for firm-level characteristics such as leverage and country-level characteristics such as GDP, as well as country, year, and industry fixed effects. Our evidence is robust to various checks, including alternative estimation methods and measures of loan loss recognition timeliness and debt structure. Moreover, we find that loan loss recognition timeliness does not affect firms' overall capital structure decisions. Furthermore, our results remain qualitatively the same if we use a country-year-level regression, a weighted-average regression, or if the sample does not include countries with a well-developed bond market.

[2] We provide more details of this hypothesis on timely loan loss recognition and debt structure, including the tension that underlies it, in Section 2.

To further address potential endogeneity concerns, we use the instrumental variable (IV) approach with an important cultural dimension, uncertainty avoidance, as the instrument for loan loss recognition timeliness. Similar to Kanagaretnam et al. (2014), we find that greater uncertainty avoidance is linked to more loan loss recognition timeliness. Using the instrumented loan loss recognition timeliness variable, we continue to find that there is less reliance on bank debt when there is more timely loan loss recognition. We further conduct a channel analysis to give support to our costly monitoring mechanism. First, we include in the regression additional controls that relate to the loan supply system. Second, we implement a difference-in-differences analysis by using the staggered adoption of public credit registries in some countries as a shock that increases monitoring costs to borrowers due to greater information sharing of credit problems. We find that the reliance on bank debt is lower for treatment countries after they adopt a public credit registry. Third, we conclude our channel analysis by conducting additional tests to examine the impact of loan loss recognition timeliness on bank loan contracts in terms of security and covenants.[3] The objective is to provide support for our argument for tighter loan conditions in a more timely loan loss accounting regime. Relying on a sample of international loan contracts, we find that banks impose more secured loans and larger covenant intensity in countries with more timely loan loss recognition. To the extent that these loan conditions are indicative of the typical terms offered to borrowers and potential borrowers, it should not come as a surprise that, ceteris paribus, borrowers would, on average, reduce their use of bank debt financing.

Next, we investigate how the relationship between loan loss recognition timeliness and debt structure varies in the cross-section to deepen our understanding of the link between bank accounting systems and firms' debt structure. These analyses can also strengthen the

[3] Prior studies find that increased monitoring from banks is tied to more debt covenants, higher spreads, and more secured loans in loan contracts (Rajan and Winton, 1995; Park, 2000; Graham et al., 2008).

identification of the effect of timely loan loss recognition. The negative effect of the loan loss recognition timeliness on borrowing firms' reliance on bank debt should be particularly strong when country- and firm-level factors make banks more cautious in lending and increase their borrower monitoring. Specifically, we predict that the effect of more timely loan loss recognition in reducing firms' use of bank debt is likely to be greater when there is stronger bank supervision in the country and when firms are more financially constrained and opaque. Stronger bank supervision makes it more difficult for banks to avoid recognizing loan losses and pressures them to monitor more stringently borrowers in both pre- and post-contracting periods (Billett et al., 1998; Flannery, 1998; Beck et al., 2006).[4] From the borrowers' perspective, such monitoring can be costly. Financially constrained firms can impose significant risk on lenders. Not only are such firms more likely to be subject to stricter bank monitoring, actions taken in relation to the monitoring, such as the non-renewal of loan facilities and additional collateral requirements, can be costly. Opaque borrowers increase banks' risk of adverse selection (Bharath et al., 2009). To the extent that banks lend to these borrowers, they are likely to impose more monitoring costs on them, which the borrowers would prefer to avoid. The cross-sectional tests with bank supervision, borrower financial constraints, and borrower opacity support our predictions.

Our paper contributes to the literature in the following ways. First, in recent years, academics and practitioners have paid greater attention to issues related to the timeliness of loan loss recognition (Beatty and Liao, 2014; Bushman, 2014). Recent papers highlight the importance of loan loss provisioning in ensuring more prudent lending ex ante (Beatty and Liao, 2011; Bushman and Williams, 2012; 2015). This literature typically focuses on how

[4] The lack of action on loan losses is a significant problem that confronts banks in many countries. For example, in some countries, weak banks might devolve into zombie banks, which are banks that have an economic net worth below zero but that continue to operate and repay debt by grace of government support. There are concerns about zombie banks crowding out healthy competitors (Claessens, 2009).

banks' timely loan loss recognition creates disciplinary effects and affects the actions of the banks themselves. In contrast, we examine how timely loan loss recognition affects borrowers' debt structure. More broadly, we shed insights on how banks' financial reporting practices can affect the debt structure of their customers (i.e., borrowers) in a setting where the customers can obtain financing from different creditors. In doing so, our paper helps to understand how bank accounting practices affect their role as market intermediaries and their customers' business decisions. We also extend the nascent cross-country literature on the impact of timely loan loss recognition (e.g., Bushman and Williams, 2012; Akins et al., 2017; Balakrishnan and Ertan, 2017).

Second, our paper contributes to the literature on firms' debt structure. Extant research generally focuses on the US market and identifies a set of borrower-level determinants of debt structure, including ownership structure (Denis and Mihov, 2003), accounting quality (Bharath et al., 2008), information asymmetry (Li et al., 2018), and audit quality (Chen et al., 2018). However, empirical research seldom analyzes whether, given that loan contracting involves circumstances faced by the banks and the firms, the banking system can affect debt structure. Our paper extends prior literature by investigating the importance of the banks' regulatory reporting system on borrowers' debt structure. To the best of our knowledge, our paper is one of the first to investigate the determinants of debt structure in a cross-country setting. In doing so, we highlight that when firms have different creditors with whom they can contract, they can make contracting choices to avoid the higher costs that arise from certain creditors' information production systems.[5]

[5] This is also related to the literature that examines the economic consequences of information production within a system (Bushee and Leuz, 2005; Marosi and Massoud, 2007; Leuz and Wysocki, 2008). This literature generally finds that in systems that require firms to produce better information, firms make choices that avoid the cost of information production. For example, Bushee and Leuz (2005) provide evidence of firms delisting to avoid the increased disclosure required by the SEC.

Our paper also has potential policy implications. It shows that better information production in the banking system can affect the reliance on bank loans when a firm engages in debt financing. Our findings suggest that attempts to increase the timeliness of loss accruals in the banking system to improve financial stability, e.g., shifting from an incurred to an expected cost model, might have a direct effect on bank loan contracting and spillover effects on other sources of debt financing (e.g., public bonds). More broadly, our paper adds insight into how improved financial reporting could have important real economic consequences, perhaps even unintended ones.[6] Obviously, the documentation of some consequences do not mean that the policies pushing for more timely loan loss recognition are necessarily suboptimal. Nevertheless, these consequences can provide useful inputs into policy making and an understanding of why some parties might be more resistant to more timely loan loss recognition.

The rest of the paper is as follows. Section 2 reviews prior research to develop testable hypotheses. Section 3 outlines our data and reports descriptive statistics on the regression variables. Section 4 covers the empirical evidence. Section 5 reports the results of the cross-sectional heterogeneity tests. Section 6 reports additional tests. Finally, Section 7 concludes.

2. Hypotheses development

Debt structure reflects the borrower's debt composition as a consequence of borrowing from different lenders. It also reflects the conditions facing both lenders and borrowers (Diamond, 1984; 1991a; 1991b; Rajan, 1992; Park, 2000; Denis and Mihov, 2003; Diamond, Kashyap, and Rajan, 2018). Prior studies conclude that lender-borrower relations are valuable to both banks and customers when making lending/borrowing decisions (James, 1987; Bharath

[6] For example, Cohen et al. (2008) offer evidence that after the Sarbanes-Oxley Act (SOX), the key objective of which was to improve financial reporting, there was a reduction in accruals-based earnings management but an increase in potentially costlier real earnings management. Similarly, Chan et al. (2015) find that firms that voluntarily adopt compensation clawback provisions substitute accruals-based earnings management for real earnings management.

et al., 2011). How timely loan loss recognition in the banking system affects the typical debt structure of a firm within an economy is an equilibrium outcome that results from the interaction between banks and borrowers. Specifically, when operating within such a system, banks and borrowers take into account the implications of timely loan loss recognition on their respective supply of and demand for loans.

We posit that firms in more timely loan loss recognition banking systems rely less on bank debt due to the reduction in the supply and demand for bank loans. In terms of loan supply, one immediate effect of more timely loan loss recognition is a reduction in available regulatory capital. This effect arises because, when banks record loan losses in the income statement, the balance sheet outcome is a reduction in the amount of capital/equity the bank has. Prior literature provides extensive evidence on how regulatory capital reduction, especially in the context of loan loss provisions, can constrain lending (Beatty and Liao, 2014). There is international evidence that in regimes with more timely loan loss recognition, banks are more concerned about the earlier negative effect on their profits and regulatory capital, as well as attention from regulators and other stakeholders vis-à-vis their loan portfolios (Bushman and Williams, 2012; Akins et al., 2017). For example, in an international study that examines banks across 27 countries, Bushman and Williams (2012) find that forward-looking provisioning that reflects timely recognition of expected future loan losses is associated with enhanced risk taking discipline.

With regard to loan demand, it is important to recognize that a borrower's debt choice is one in which the borrower is faced with various potential creditors with which it could contract (Diamond, 1984; Rajan, 1992). For the borrower, the choice between public and bank debt depends on the relevant benefits and costs of these options (Kale and Meneghetti, 2011). Economic theory asserts that costly monitoring from principals can affect the choices the agent makes (Stiglitz and Weiss, 1981; Bester and Hellwig, 1987; Holmstrom and Tirole, 1997).

Specifically, from a debt choice perspective, if one creditor is expected to engage in actions that could create more costs for the borrower, then ex-ante, the borrower is likely to opt to contract with another creditor, ceteris paribus (Diamond 1984; 1991a). Berlin and Loeys (1988) develop a model that shows that monitoring costs can be a key driver of a firm's debt choice.

In countries where banks recognize loan losses in a more timely fashion, they are also more likely to engage in tougher monitoring of their borrowers (Leftwich, 1983; Beatty and Liao, 2014; Christensen et al., 2016). Before contracting, borrowers are likely to be subject to more due diligence and costly demands from banks (e.g., more information demands, including audited financial statements and corporate site visits, collateral, covenants, and guarantees). After contracting, borrowers can also expect closer monitoring by banks (e.g., more frequent financial reviews and corporate site visits) and a higher likelihood of costly bank actions (e.g., collateral seizure, withdrawal of credit lines, production of propriety information, and non-renewal of loan facilities). Hence, from an ex-ante perspective, borrowers' desire to avoid costly monitoring can reduce loan demand. Lin et al. (2013) find that firms controlled by large shareholders with excess control rights may choose public debt financing over bank debt as a way of avoiding scrutiny and insulating themselves from bank monitoring.

While we predict that the equilibrium debt structure of borrowers is to rely more on private bank debt than public bonds in banking systems with greater loan loss recognition, there might be reasons to expect the opposite outcome. In other words, there may be tension in the hypothesis on how more timely loan loss recognition in the banking system affects firms' debt structure. From a loan supply perspective, the business of lending essentially involves making loans from a bank's loanable funds, which it replenishes by collecting principal and interest and by making more loans.[7] Hence, in the long run and to the extent that banks are more prudent

[7] Loanable funds can also come from deposits and capital infusions. Nevertheless, this depiction of the lending business reflects what one would expect for a sustainable lending business.

in their lending, they might have more loanable funds when they experience fewer non-performing loans, including loan defaults (Acharya and Ryan, 2016). Beatty and Liao (2011) show that reductions in lending during recessions, relative to expansionary periods, are lower for banks that delay less; they also show that smaller delays reduce the recessionary capital crunch effect. Hence, while there is more discipline in banks' risk taking when there is more timely loan loss recognition (Bushman and Williams, 2012), it is ex-ante unclear whether loan supply, on average, will be lower with more timely loan loss recognition.

From a demand perspective, increased bank monitoring can give borrowers monitoring certification. Compared with public debtholders, banks have the advantage in terms of monitoring efficiency (Diamond, 1984; Fama, 1985; Boyd and Prescott, 1986; Berlin and Loeys, 1988). Firms with severe agency problems can try to mitigate them by subjecting themselves to greater monitoring (Jensen and Meckling, 1976; Aghion and Tirole, 1997). Diamond (1991a) uses a model to show that a firm's debt choice depends on its reputation and monitoring needs. He develops a model that shows that firms with agency problems may use monitored bank debt to signal their reduced moral hazard.[8] In their review of the theoretical works on debt choice, Kale and Meneghetti (2011: 12) conclude that: "…the choice between public and private debt is governed by four basic factors, which are not mutually exclusive. First is the degree to which a firm needs certification: the greater the need the greater the reliance on bank debt."[9]

Although there is tension underlying our research question, we predict, on balance, that the equilibrium reliance would be on less bank debt in a debt structure with more timely loan

[8] Relatedly, Fan and Wong (2005) find that firms in East Asian countries with severe agency problems hire one of the Big Five auditors, which are regarded as better monitors, to signal their efforts to protect minority shareholder interests.

[9] Two papers document the monitoring role of banks. Vashishtha (2014) finds that when bank monitoring becomes stronger in cases of covenant violations, corporate disclosure decreases because bank monitoring reduces the need for monitoring via public disclosures. Ahn and Choi (2009) find that bank monitoring decreases earnings management in firms.

loss recognition. The various loan supply and demand effects discussed above are not mutually exclusive in that there is likely to be cross-sectional variation in how lenders and borrowers are impacted within the same system. For example, some borrowers might want to avoid costly monitoring whereas others might value the monitoring certification that comes with more timely loan loss recognition. However, given that a more immediate/direct effect of more timely loan loss recognition is that it cuts directly into a bank's immediate capacity to lend and creates pressure to scrutinize borrowers more intensely, a reduction in the loan supply might be more likely. Prior cross-country evidence related to debt choice suggests that borrowers typically demonstrate avoidance of costly monitoring in debt choice, as opposed to choosing more costly debt as a form of certification (e.g., Lin et al., 2013). Hence, our first hypothesis, stated in the alternative form, is:

H1: *More timely loan loss recognition in the banking system is associated with a lower reliance on bank loans in firms' debt structure.*

To examine whether tighter loan conditions (cautious lending and increased monitoring) arising from more timely loan loss recognition indeed drives borrowers to have fewer bank loans in their debt structure, we investigate whether stricter bank supervision exacerbates the reduction in the use of bank loans in the presence of timely loan loss recognition (Barth et al., 2004). Bank supervision plays an important role in the loan loss recognition process. When bank regulators inspect a bank, they not only review its lending and loan accounting policies, but also its actual loans to ensure that the bank is establishing sufficient loan loss reserves and taking adequate steps (e.g., collateral seizure and credit limit reduction) to mitigate potential loan losses. When banks accrue loan losses earlier, more stringent bank supervision means earlier strict scrutiny over the loan losses and constraints on lending. Ex-ante, banks are more likely to be cautious in lending when they foresee that loan losses are going to create more

trouble, especially as, in a banking system with more timely loan loss recognition and stricter bank supervision, banks have less time to salvage the situation or hide problems.

Not surprisingly, there will be spillover effects from the regulatory monitoring of a bank to the bank's monitoring of its borrowers. Specifically, greater bank supervision is likely to make banks monitor their borrowers more closely and to be harsher in dealing with errant borrowers. Hence, from the borrowers' perspective, costly monitoring in a banking system with more timely loan loss recognition becomes a bigger problem in a banking system with stricter bank supervision. For example, collateral seizure, credit limit reduction, and the non-renewal of loan facilities can impede the borrowers' business; their likelihood increases when banks are under greater pressure from regulators to take such actions. Hence, our second hypothesis, stated in the alternative form, is:

H2: *The reduction in borrowers' reliance on bank debt due to more timely loan loss recognition in the banking system is greater if there is stricter bank supervision.*

Existing financial constraints play an important role in loan contracting (Campello et al., 2010). For banks, more timely loan loss recognition can be regarded as a corporate governance mechanism that constrains and even punishes the bank and its managers for engaging in excessive risk taking (Bushman and Williams, 2012). Borrowers who are financially constrained impose higher expected loan losses on the banks. Stated differently, these borrowers are riskier. Due to the disciplinary effect of more timely loan loss recognition, banks are likely to be more cautious about supplying loans to financially constrained borrowers.

From the perspective of loan demand, financially constrained borrowers are also likely to be more concerned about the costs of borrowing in a banking system with more timely loan loss recognition. First, to the extent that banks vet potential borrowers more stringently and impose tougher lending terms on them, the impact is likely to be larger for financially constrained borrowers. Even if a bank were to lend to a financially constrained borrower, the

borrower should expect greater post-contracting scrutiny from the bank, which could manifest in costly actions against the borrower. In particular, to the extent that banks tighten their financing (e.g., require more collateral, trigger debt covenants, engage in loan renegotiation, and not renew loans), such actions are going to be more costly for financially constrained borrowers (Holmstrom and Tirole, 1997; Duchin et al., 2010).

In sum, more timely loan loss recognition is expected to reduce loan supply and demand more for financially constrained borrowers, which in turn reduces such their reliance on bank debt in their debt financing. Hence, our third hypothesis is:

H3: *The reduction in borrowers' reliance on bank debt due to more timely loan loss recognition in the banking system is greater for financially constrained borrowers.*

Our final hypothesis examines whether the reduction in borrower's reliance on bank debt with respect to more timely loan loss recognition is greater when the borrower is more opaque. Banks are especially concerned about providing loans to opaque firms because there is greater information asymmetry between the bank and such firms and because these firms are more likely to have severe agency problems (Sufi, 2007; Lin et al., 2012; Lin et al., 2013). To the extent that banks are more cautious in lending when there is more timely loan loss recognition, we expect banks to be even more cautious when dealing with opaque borrowers. Prior studies present evidence that is consistent with debtholders being more concerned about the risk of lending to more opaque firms (Sengupta, 1998; Francis et al., 2005). Hutton et al. (2009) document that firms with opaque financial reporting are more likely to hide bad news and suffer from a stock price crash in the following year. In a system with more timely loan loss recognition, banks expect the spillover effects of borrowers' problems on a bank's lending capacity to be more quickly felt. The bank thus becomes more cautious about lending to potentially problematic borrowers, such as opaque borrowers.

Opaque borrowers themselves are also likely to be concerned about the cost of monitoring when there is more timely loan loss recognition in the banking system. Lin et al. (2013) find that the negative relation between control-ownership divergence and bank debt reliance is stronger in opaque firms. Moreover, for these borrowers, management tries to avoid monitoring because of the high cost of preparing the information needed to meet monitoring requirements before and after a contract. Elyasiani and Zhang (2015) find that in liquidity management, entrenched CEOs prefer cash to lines of credit because the latter are usually accompanied by bank monitoring. Banks in countries with timelier loan loss recognition require more information to impose strict monitoring and decrease their loan loss risks. In anticipation of this requirement, opaque borrowers in these countries have a particularly strong motivation to avoid bank debt. Hence, to the extent that banks facing more timely loan loss recognition are more cautious in lending to opaque borrowers and opaque borrowers prefer to remain opaque and avoid monitoring, our final hypothesis is:

H4: *The reduction in borrowers' reliance on bank debt due to more timely loan loss recognition in the banking system is greater for opaque borrowers.*

3. Sample and variables

3.1. Sample

We use an international setting to investigate how loan loss recognition in banking systems across different countries affects firms' debt structure. To calculate the timeliness of loan loss provisions, we obtain bank financial statement data from BankScope. Following prior literature, we include both private and public banks in each country (Bushman and Williams, 2012; Akins et al., 2017). Our final BankScope sample include 30,576 bank-year observations from 55 countries. We then merge the BankScope data with the new Capital IQ database, which provides comprehensive data on debt structure from 2001 onwards (Li et al., 2018). We exclude financial firms (SIC from 6000 to 6999) and those with missing financial statements and debt

structure data. This procedure results in a final sample of 35,277 firms from 55 countries, corresponding to 225,153 firm-year observations over the 2001-2015 period.

3.2. Variables

Following recent international studies on the determinants of debt structure (e.g., Lin et al., 2013; Boubakri and Saffar, 2018), we identify a firm's debt structure through its reliance on bank debt. More specifically, our dependent variable, *Bank debt*, is defined as the proportion of a firm's bank debt to its total debt, where bank debt is defined as the sum of the term loans and revolving credit and total debt is defined as the sum of all types of debt, including commercial paper, revolving credit, term loans, subordinated bonds and notes, senior bonds and notes, capital leases, and other debt.

Our main independent variable, *LLRT*, is the measure of the loan loss recognition timeliness for each country in each year and is computed following Akins et al. (2017). For each country-year, we first compute each bank's loan loss reserves at year *t*, deflated by the non-performing loans at time *t+1*. This measure captures how loan loss reserves at time *t* reflect the current level and future changes in non-performing loans at time *t+1*.[10] Then we calculate the average value of loan loss reserves to the non-performing loans ratio for all banks in each country-year. Therefore, *LLRT* measures the extent to which the banks in the country build loan loss reserves by taking into account future non-performing loans.[11]

[10] Note that non-performing loans at t+1 equal non-performing loans at time t plus the change in non-performing loans from t to t+1. Later in the paper, we demonstrate the robustness of our results to alternative measures of loan loss recognition timeliness, including the measures used in Beatty and Liao (2011) and Bushman and Williams (2012).

[11] This measure is similar in spirit to the regression method used in Bushman and Williams (2012) to capture country-level loan loss recognition timeliness. An advantage of this measure is that it is a simple measure that focuses on the essence of the concept of timely loan loss recognition and does not require the researcher to make model assumptions and parameters. A disadvantage of it is that it is not sufficiently precise in capturing timely loan loss recognition.

We control for both firm-level and country-year-level characteristics in the model. More specifically, we control for *Size, Leverage, Profitability, Tangibility, Tobin's Q, Z-score*, *GDP*, *Private credit*, and *Bank concentration*. *Size* is defined as the natural logarithm of total assets in millions of US dollars. We control for firm size since the prior literature finds that large (small) firms prefer public (bank) debt (Houston and James, 1996). *Leverage* is defined as the sum of long-term and short-term debt over total assets. Prior literature finds mixed evidence about how the current leverage level affects firm debt structure (Diamond, 1991b; Denis and Mihov, 2003; Billett et al., 2007). *Profitability* is defined as earnings before interest, taxes, depreciation, and amortization over total assets. Profitability captures a firm's ability to pay for debt. *Tangibility* is defined as net property, plant, and equipment divided by total assets. We use tangibility to capture firm risk. Firms with more fixed assets are perceived as having lower risk. *Tobin's Q* is defined as the sum of the market value of equity and the book value of debt, divided by total assets. We include Tobin's Q to control for investment opportunity and firm growth. Firms with a lot of investment opportunities and high growth rates prefer public debt to bank debt (Diamond, 1991a). *Z-score* is calculated following Altman (1968) and it captures firms' financial health and probability of default. Denis and Mihov (2003) find that firms with a high probability of default prefer bank debt. We further control for three country-year-level characteristics that could shape firm debt structure. *GDP* is the natural logarithm of GDP per capita in constant 2005 US dollars. *Private credit* is from World Bank, defined as private credit by deposit money banks and other financial institutions, deflated by GDP. Furthermore, we control for *Bank concentration*, defined as the assets of the three largest banks as a share of the assets of all commercial banks.

3.3. Descriptive statistics

Table 1 presents our distribution of firms by country within our sample. There are 55 countries in the sample, including both developed and developing countries. Of these, the

United States (with 44,697 firms-year observations), Japan (28,488 firm-year observations), and India (20,364 firm-year observations) have the largest number of observations in the sample, while Mauritius (with 63 firm-year observations), Colombia (113 firm-year observations), and the Czech Republic (184 firm-year observations) have the smallest. Table 1 confirms that our sample covers a comprehensive set of geographical regions, which is important when examining the interplay between loan loss provision timeliness and firm-level debt structure.

<Insert Table 1 here>

Table 2 presents the sample's summary statistics. Panel A presents the variable descriptive statistics. All continuous firm-level variables are winsorized at the top and bottom 1%. The mean ratio of *Bank debt* is 0.679 and the median ratio is 0.893. Bank debt is therefore a very important source of debt financing for our sample firms. The mean ratio for *LLRT* is 1.615, with a standard deviation of 1.598. These two figures are consistent with those in Lin et al. (2013) and Akins et al. (2017), respectively. Turning to the firm-level controls, the results show that our sample includes small and large firms, which makes it ideal for studying firms' debt structure. The mean (median) firm size is 5.239 (5.198).

Panel B reports the Pearson correlation coefficients for all variables in the sample. We find that *Bank debt* is negatively correlated with *LLRT*. Moreover, *Bank debt* is positively related *Tangibility*, *Profitability*, *Z-score*, *Private credit*, and *Bank concentration* and negatively related to *Leverage*, *Size*, *Tobin's Q*, and *GDP*.

<Insert Table 2 here>

4. Empirical results

4.1. Model specification

Following recent literature (Lin et al., 2013; Boubaker et al., 2017; Boubakri and Saffar, 2018), we use the following regression specification to test the effect of timely loan loss recognition on firms' debt structure:

$$Bank\ debt_{i,t} = \alpha_0 + \alpha_1 LLRT_{i,t} + \alpha_2 Size_{i,t} + \alpha_3 Leverage_{i,t} + \alpha_4 Profitabilit_{i,t} + \alpha_5 Tangibility_{i,t} + \alpha_6 Tobin's\ Q_{i,t} + \alpha_7\ Zsc_{i,t} + \alpha_8 GDP_t + \alpha_9 Private\ cre_t + \alpha_{10} Bank\ concentrati_t + Country\ F.E. + Year\ F.E. + Industry\ F.E. + \varepsilon_{i,t}, \quad (1)$$

where *i* and *t* are indicators for the firm and year, respectively. *Bank debt* is the proportion of bank debt in a firm's debt structure. *LLRT* is the timeliness of loan loss recognition for each country in each year. Firm-level control variables include *Size, Leverage, Profitability, Tangibility, Tobin's Q,* and *Z-score,* defined in Section 3.2. Country-year-level control variables include *GDP*, *Private credit*, and *Bank concentration*. We include country, year, and industry fixed effects in the regression to control for the factors related to firms' debt structure that are invariant across countries, industries or over time. ε is the error term. Coefficient estimates and standard errors are robust and clustered at the country and year levels. In this analysis, we are mainly interested in the coefficient on *LLRT*, α_1, which captures the degree to which the variation in the country-level loan loss provision timeliness explains firm reliance on bank debt.

4.2. Main evidence

Table 3 presents the results of the regression based on Equation (1). Columns (1) and (2) report results using ordinary least squares regressions. We also report a Tobit model regression result in column (3) since the dependent variable, *Bank debt*, is constrained between 0 and 1. Column (1) reports the regression results without any firm-level control variables in the regression. We find that the coefficient α_1 on *LLRT* is negative and statistically significant at the 1% level, suggesting that bank debt reliance decreases with timely loan loss recognition.

In column (2), after including all control variables in the regression, the coefficient on *LLRT* remains significantly negative. Finally, in column (3), where a Tobit model is considered, the results are similar to those in the OLS regressions. The results in Table 3 are consistent with the costly monitoring avoidance prediction that more timely loan loss recognition reduces firms' reliance on bank debt.

The signs of the coefficients on the control variables are generally consistent with the prior literature. The results show that bank debt increases with leverage, profitability, and tangibility. Moreover, bank debt is negatively related to size and growth opportunities, which is consistent with prior literature's finding that large companies or companies with investment opportunities prefer public debt (Denis and Mihov, 2003; Morellec et al., 2014). Furthermore, the results show that bank debt is significantly lower in countries with a high GDP per capita.

<Insert Table 3 here>

Collectively, our results suggest that firms from countries where banks recognize loan losses in a more timely fashion will rely less on bank debt as a debt-financing source. This is consistent with more cautious bank lending and borrowers avoiding increased bank monitoring.

4.3. Alternative measures of LLR timeliness, debt structure, and capital structure

To further test that our documented evidence is not due to the uniqueness of the *LLRT* measure, we next examine whether our results are robust to different measures of the timeliness of loan loss recognition. First, we use the timeliness of loan loss recognition measure in Beatty and Liao (2011), defined as the ratio of loan loss reserves at time *t* to non-performing loans at time *t*. Similar to our main measure of *LLRT*, we calculate the measure at the country-year level by averaging the ratio for all banks within the country, *LLRT1*. The result of the analysis of the relation between bank debt preference and the alternative timeliness of loan loss recognition is

reported in column (1) of Table 4. The coefficient on *LLRT1* is significantly negative at the 1% level, suggesting that timely loan loss recognition decreases bank debt in firm's debt structure.

The second alternative measure of loan loss recognition timeliness we use follows Bushman and Williams (2012). First, we run the following equation for each country-year.

$$LLP_{t,j} = r_0 + r_1 Ebllp_{t,j} + r_2 \Delta NPL_{t+1,j} + r_3 \Delta NPL_{t,j} + r_4 \Delta NPL_{t-1,j} + r_5 \Delta NPL_{t-2,j} + r_6 CAP_{t-1,j} + r_7 Size_{t-1,j} + r_8 \%\Delta GDP_{t,j} + \varepsilon_{t,j}. \quad (2)$$

$LLP_{t,j}$ is the loan loss provision scaled by lagged total loans for bank *j* at year *t*. $Ebllp_{t,j}$ is earnings before loan loss provision and taxes at time *t* scaled by lagged total loans. $\Delta NPL_{t+1,j}$ is the change in non-performing loans at time *t+1* scaled by lagged total assets. $CAP_{t-1,j}$ is the bank's equity capital to total assets at year *t-1*. $Size_{t-1,j}$ is the bank's natural logarithm of total assets in millions of US dollars at year *t-1*. $\%\Delta GDP_{t,j}$ is the percentage change in GDP per capita at year *t*. After controlling for the current and lagged performance of loan portfolios, r_2 captures how loan loss provisions at time *t* predict future changes in loan portfolio performance (Bushman and Williams, 2012; Akins et al., 2017). Therefore, r_2 captures the timeliness of loan loss recognition. *LLRT2* is equal to r_2 if the coefficient is statistically different from zero, zero otherwise. The result is reported in Table 4, column (2). The coefficient on *LLRT2* is significantly negative at the 1% level.

The third alternative measure of loan loss recognition timeliness follows Akins et al. (2017). It is a weighted average of our main measure, *LLRT*. When calculating the average loan loss reserve timeliness for each country-year, we use each bank's total loans in year *t* as the weight, since large banks are more important and have a larger influence in determining the timeliness of loan loss reserves in a country. The result is reported in Table 4, column (3). The result is consistent with our main findings. The coefficient on *LLRT3* is significantly negative at the 1% level.

We further check if our results remain unchanged using an alternative measure of debt structure. In our main regression, debt structure is defined as the proportion of bank debt to total debt. We then change the debt structure proxy using public debt. *Public debt* is defined as the sum of commercial paper, senior bonds and notes, and subordinated bonds and notes to total debt. Since total debt is mainly comprised of public and bank debt and we find that bank debt decreases with timely loan loss recognition, our prediction is that the relation between public debt and *LLRT* should be positive. The results are presented in column (4) of Table 4. Consistent with our prediction, the coefficient on *LLRT* loads positively and is statistically significant at the 1% level. Therefore, our main results are not sensitive to alternative measures of debt structure.

We further examine if more timely loan loss recognition affects firms' capital structure. The effect of more timely loan loss recognition on capital structure is unclear because firms could switch from bank debt to other debt types (which is the focus of our paper) or to equity financing. To the extent that a firm wants to maintain a certain leverage, then the former would be a likely option. To examine whether the firm's leverage is associated with timely loan loss recognition, we use the leverage ratio, *Leverage*, as the dependent variable in the regression specification in column 5. We do not find a significant association between loan loss recognition timeliness and leverage ratio. Taken with the earlier results, these additional results suggest that more timely loan loss recognition only affects the reliance on different forms of debt, not on debt versus equity.

<Insert Table 4 here>

4.4. Alternative model specifications

Table 5 examines whether our results are robust to different model specifications. First, because the number of firms is not constant across countries such that the estimated coefficients

could be largely determined by a few countries with the largest number of firms, we estimate a country-year-level regression, since *LLRT* is a country-year-level measure. This conservative approach gives each country-year an equal weight by using only the country-year-level average of the firm-level observations. In column (1), we construct a country-year-level measure of bank debt reliance by taking the mean of the bank debt for all sample firms in a given country and year. We do the same for the other control variables. The results in column (1) of Table 5 show that *LLRT* loads negatively and is statistically significant at the 1% level. Hence, the use of a country-year or a firm-year measure of debt structure does not seem to affect our results.

To further address concerns about sample composition, in column (2) of Table 5 we run a weighted regression in which the weights are given by the inverse of the number of observations per country-year. In this regression, *LLRT* loads negatively and is significant at the 1% level, suggesting that the unbalanced number of firms between countries is not driving our findings. Overall, the results in columns (1) and (2) indicate that our earlier result of a negative relation between timely loan loss recognition and bank debt reliance does not seem to be driven by the uneven distribution of observations across different countries.

Furthermore, we use two approaches to mitigate the concern that our main findings are driven by certain countries. First, we drop firms from the US, Japan, and India, the top three countries with the largest number of observations in the sample, and re-estimate Equation (1). The result reported in column (3) of Table 5 shows that the negative effect of timely loan loss recognition on bank debt reliance is not driven by the three largest countries in our sample. Next, we follow Akins et al. (2017) and exclude the top three countries with the largest GDP per capita to the number of firms in the country. We use the GDP-to-firm-numbers ratio to capture the size of the country's economy. Dropping these countries from the sample does not alter our evidence.

Next, we exclude the financial crisis period, i.e., 2007-2008, from the sample period because firms had difficulty borrowing from banks during the financial crisis. The results reported in column (5) of Table 5 remain unchanged: we continue to find a negative relation between loan loss recognition timeliness and bank debt.

Finally, we exclude firms from countries that do not have well-developed bond markets because these firms are less likely to find public debt financing feasible and are thus less likely to have to choose between bank debt and public debt. Following Lin et al. (2013), we exclude countries with a bond market capitalization to GDP ratio below 10%. The results are presented in column (6) of Table 5. Although the number of observations shrinks, the coefficient on *LLRT* remains significantly negative at the 1% level.

Collectively, the above set of results indicates that the negative impact of timely loan loss recognition on the reliance on bank debt is robust to alternative model specifications that deal with potential concerns related to the nature of the data.

<Insert Table 5 here>

4.5. Endogeneity: Instrumental variable approach

In the context of a cross-country data analysis, omitted variables may be a major econometric concern. If certain omitted variables are related to firms' debt structure and these also affect the timeliness of loan loss recognition in the country, endogeneity could be an issue. We first note that our regressions include country, year, and industry fixed effects to mitigate concerns that debt structure is driven by country-, time-, or industry- invariant unobservable variables.

Second, to address the potential endogeneity problem stemming from reverse causality, we use a standard instrumental variable (IV) approach despite the standard difficulty in

identifying strong, valid instruments.[12] Kanagaretnam et al. (2014) find that the culture dimension, uncertainty avoidance, is positively related to accounting conservatism in the banking industry. Their study is based on the work of Hofstede (1984; 2001) who argues that people in countries with a high level of uncertainty avoidance shun ambiguous and uncertain situations and are more averse to future problems. In the context of loan loss recognition, one might expect bank managers in such countries to be more conservative in accounting because they are more averse to delaying loss recognition, which would subject the bank (and themselves) to possible adverse consequences such as regulatory intervention, litigations, reputation loss, and bank runs. Therefore, similar to Kanagaretnam et al. (2014), we expect that banks in higher uncertainty avoidance societies to have more timely loan loss recognition and use the Hofstede's (2001) uncertainty avoidance index, *Uncertainty avoidance*, as an instrument for loan loss provision timeliness.[13]

The results of the IV analyses are reported in Table 6. In the first stage, we use *LLRT* as the dependent variable and *Uncertainty avoidance* as the instrument. Country fixed effects are dropped from the regression since *Uncertainty avoidance* is at the country level. Consistent with our prediction, *Uncertainty avoidance* has a positive and significant impact (0.023, t=5.64) on *LLRT*, suggesting that the uncertainty avoidance dimension of the national culture is a good predictor of the loan loss provision timeliness. To check the validity of our instrument, we conduct two tests. We first run an F-test of the excluded exogenous variable. The results reject

[12] One could argue that a low proportion of bank debt in a borrower's debt structure motivates the banks in these countries to recognize expected loan losses in a more timely fashion because they face difficulties in attracting borrowers. Such difficulties make them more vulnerable to bank failure, so they make reserves and recognize expected losses in a more timely way. In this case, endogeneity from reverse causality is a concern. The instrumental variable (IV) approach is widely used in prior literature to address this type of endogeneity (Reeb et al., 2012; Kjenstad et al., 2016; Boubaker et al., 2017). Given that our measure of timely loan loss recognition is a country measure, the instrument should also be a country measure.

[13] In terms of the exclusion criterion for IV, we are not aware of any prior papers that document a link between uncertainty avoidance and debt preference. We also posit that uncertainty avoidance is unlikely to have a direct effect on bank debt preference because it is ex-ante unclear that people who want to avoid uncertainty would choose one form of debt over another.

the null hypothesis that the instrument does not explain loan loss provision timeliness. We also conduct a Kleibergen-Paap *rk* LM test, which rejects the null hypothesis that the model is under-identified at the 1% level. The results of second stage regression, reported in column (2) of Table 6, show that the instrumented value of loan loss provision timeliness is significantly and negatively associated with bank debt reliance, confirming our prior findings. Hence, the evidence suggests that our results are not driven by potential endogeneity issue.

<Insert Table 6 here>

4.6. Channel analysis: Costly monitoring avoidance

4.6.1. Channel analysis: Additional control variables related to loan supply system

In Table 7, Panel A, we control for three additional country-year control variables related to loan supply to rule out the possibility that the negative impact of timely loan loss recognition on bank debt reliance may be driven in part by omitted country-level factors. Prior studies find that loan supply conditions strongly influence debt contracting between banks and borrowers (Hubbard, Kuttner, and Palia, 2002; Chava and Purnanandam, 2011; Becker and Ivashina, 2014). We are concerned with loan supply system characteristics because in countries where supply of bank debt is adequate, it is easier for borrowers to approach bank loans, while this preference for bank debt is not caused by decreased bank monitoring costs. The additional country-year variables are from three distinct perspectives of the banking system, namely, bank access, bank stability, and bank depth. *Bank access* is defined as the number of bank branches per 100,000 adults. *Bank stability* is defined using the bank's z-score, which captures the probability of default in the country's commercial banking system. *Bank depth* is defined as the ratio of central bank assets to GDP. All three variables are from the Global Financial Development Database in World Bank and all are strongly related to loan supply in the country.

A country with easier access to banks, higher banking system stability, or stronger central banks is more likely to have a stable loan supply.

Table 7, Panel A reports the regression results, including the three additional country-year-level factors separately in columns (1) to (3) and together in column (4). We find that the coefficient on *LLRT* consistently remains negative and statistically significant, indicating that the relation we document between timely loan loss recognition and bank debt reliance is not driven by potential omitted country-level characteristics. We also find that bank debt reliance is positively related to bank access and negatively related to bank stability.

4.6.2. Channel analysis: The establishment of public credit registries

As noted earlier, a channel through which greater loan loss recognition timeliness reduces reliance on bank debt is a reduction in the demand for bank debt due to borrowers' avoidance of costly monitoring. We rely on a shock to the cost of monitoring to provide some evidence of this channel, in the process providing some further support for a causal link between loan loss recognition timeliness and debt structure. Specifically, we rely on the establishment of public credit registries as a shift in conditions within an economy that makes it more important for borrowers to engage in costly monitoring avoidance. We note that the establishment of public credit registries is a country-level decision, so banks and borrowers are unlikely to influence it.

The establishment of public credit registries worldwide has increased the amount of information sharing among creditors and has enabled creditors to gain more access to borrower information (Jappelli and Pagano, 1999; Balakrishnan and Ertan, 2017). Miller (2003) notes that public credit registries increase banks' information about borrowers and enhance bank's monitoring of them. From the borrower's perspective, their concern would be the negative spillover effects of problems with one creditor to its other business activities (including

financing from other capital providers) as a result of information sharing via the public credit registry. Hence, the desire to avoid monitoring, especially by a creditor who is likely to be more difficult to deal with, is likely to be greater after the establishment of a public credit registry. Simply stated, ex-ante, a borrower would like to avoid a creditor that could cause it to acquire a bad credit history because a bad credit history would not only affect its ability to obtain credit elsewhere but also result in other parties (e.g., suppliers and customers) being less willing to contract with it.

We consider the staggered adoption of public credit registries as an event that increases the sharing of credit information in the economy, which in turn increases the cost to the borrower should it obtain credit from a more-difficult-to-deal-with creditor. The treatment sample includes countries that have established public credit registries during the period of our study, 2001 through 2015. The event year is defined as the year in which the country established a public credit registry. Similar to Balakrishnan and Ertan (2017), we identify one control country for each treatment country based on geographic location, GDP, and the number of banks. Specifically, for each treatment country, first we identify its neighboring countries. If a country shares no borders with other countries, we identify its nearest neighbors by sea. Then we match the treatment countries with their neighbors in terms of the closest GDP and the number of banks. Our final treatment sample includes five countries (year of the establishment of public credit registry), China (2005), the Czech Republic (2002), Indonesia (2004), Latvia (2008), and Mauritius (2005). The matched control sample includes Hong Kong, Hungary, Philippines, Iceland, and Zambia, respectively. Event-years for the control countries are the same for their matched treatment countries.

To examine whether the establishment of a credit registry results in a larger reduction in reliance on bank debt in a banking system with greater loan loss recognition timeliness, we use the following model:

$$Bank\ debt = \beta_1 Post + \beta_2 LLRT + \beta_3 Treat \times LLRT + \beta_4 Post \times LLRT + \beta_5 Treat \times Post + \beta_6 Treat \times Post \times LLRT + Firm\ controls + Count\_year\ controls + Country\ F.E. + Industry\ F.E. + Year\ F.E. + \varepsilon. \quad (3)$$

Post is a dummy variable equal to one if the observation year is after the public credit registry adoption year, zero otherwise. *Treat* is a dummy variable equal to one if the firm is located in a country that has established a public credit registry, zero otherwise. *Treat* is omitted from the regression since it is a country-level variable, while we include country fixed effects in the model. Our focus is on the coefficient β_6 on the three-way interaction, *Treat*×*Post*×*LLRT*.

The results are presented in Table 7, Panel B. Consistent with our prediction, we find that the coefficient on *Treat*×*Post*×*LLRT* is significantly negative at the 1% level. The results show that after the establishment of a public credit registry, firms are less likely to rely on bank debt in the treatment sample with respect to a comparable control sample. This evidence lends further support to our argument that a reduction in bank loan demand due to a desire to avoid costly monitoring is one channel that links more timely loan loss recognition to a decrease in the reliance on bank debt.

4.6.3. Channel analysis: the impact on bank loan contracting

Our previous evidence shows that timely loan loss recognition decreases firms' reliance on bank debt through tighter loan conditions. We further explore whether timely loan loss recognition affects other bank loan contracting terms. Prior studies find that debt characteristics such as covenant intensity and securities reflect monitoring needs and incentives (Diamond, 1991a; 1991b). Graham et al. (2008) find that after a financial restatement, the bank's increased monitoring leads to more debt covenants, higher spreads, and more secured loans with borrowing firms.

We examine additional contracting terms from the DealScan database, including loan covenant intensity, loan spread, and loan security. Following Hasan et al. (2017), we define *Covenant* as the loan covenant intensity, which is the natural logarithm of 1 plus the total number of covenants in the loan facility a firm obtains. *Spread* is the all-in loan spread drawn in the DealScan database for a given loan facility. The all-in loan spread drawn is defined as the amount of loan interest payment the borrower pays over LIBOR. *Spread* is the natural logarithm of the all-in spread drawn. *Security* is a dummy variable that equals 1 if a loan that a firm obtains is secured by a collateral requirement and 0 otherwise. In addition to the firm-level controls in the main regression, following Hasan et al. (2017) we further include *Cashholdings*, *ROA Volatility*, and *Sales Growth* as control variables.

The results are presented in Table 7, Panel C. Column (1) presents the results using *Security* as the dependent variable, while column (2) does so using *Covenant* as the dependent variable. In both columns, the coefficients on *LLRT* are significantly positive, indicating that banks from countries with more timely loan loss recognition require more secured loans and impose more loan covenants. These findings are consistent with our tighter loan conditions argument in countries with more timely loan loss recognition regimes.

<Insert Table 7 here>

5. Cross-sectional variation on the timeliness of loan loss recognition and debt structure

To further our understanding of how debt structure in more timely loan loss recognition banking systems varies across different countries and firms, we conduct a series of cross-sectional analyses.

5.1. The role of country-level bank supervision

First, we explore the role of country-level bank supervision on the relation between timely loan loss recognition and debt structure. As discussed in H2, to the extent that cautious

lending and costly monitoring avoidance explain the reduction in the reliance on bank debt when there is greater loan loss recognition timeliness, the reduction is likely to be more pronounced in countries with stronger bank supervisory power. The basic intuition is that when there is stronger bank supervision, banks will be more cautious, will more closely scrutinize loans, and will be under greater pressure to take enforcement action against errant borrowers when loan loss provisions are accrued. Therefore, we predict that a combination of timely loss recognition and stronger enforcement makes banks more prudent in their lending and firms more concerned about the costs of borrowing from them.

We use three country-level proxies for bank supervision. The first two are *Supervisory power* and *Private monitoring* from Beck et al. (2006). *Supervisory power* captures the extent to which bank supervisors can force banks to improve their corporate governance. *Private monitoring* captures the extent to which bank supervision helps private investors monitor banks by forcing the banks to increase their disclosure of publicly available information. The third country-level bank supervision proxy is *Government ownership in banks*. Shleifer and Vishny (1994) conclude that government participation in banks weakens their corporate governance. We determine *Government ownership in banks* for each country-year from the World Bank's Bank Regulation and Supervision Survey. [14]

The results are presented in Table 8. We implement a subsample analysis as we include country fixed effects in our specifications and *Supervisory power* and *Private monitoring* both employ country-level data. In addition, a subsample analysis allows the control variables to vary across the partitions. In Table 7, we find across all proxies that the coefficient α_1 on *LLRT* is negative and statistically significant in the subsample of firms located in countries with sound

[14] The data for *Government Ownership in banks* are available at: http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20345037~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html.

bank supervision (columns 1, 3, and 6), suggesting that strong bank supervision intensifies tighter loan conditions (cautious lending and increased monitoring). In contrast, we find that the coefficient on *LLRT* is statistically insignificant in the subsample of countries with weak bank supervision (columns 2, 4, and 5). The difference in the α_1 coefficients between the samples of weak and strong bank supervision is statistically significant at the 5% level or better for all three of the country-level conditioning variables. Consistent with the prediction in H_2, these findings support the intuition that bank supervision intensifies, on average, borrowers' incentives to avoid bank debt financing.

<Insert Table 8 here>

5.2. Timely loan loss recognition, debt structure, and financial constraints

We then explore how the tighter loan conditions vary across different types of borrowers. Since debt financing is one of the primary financing sources for a firm, firms with a limited ability to raise funds are, relative to non-constrained firms, more concerned that their cost of financing will increase or that their financing sources will become stricter. In countries with timely loan loss recognition, financially constrained firms are more concerned about costly monitoring since their likelihood of defaulting on the debt covenants is higher. Moreover, banks are likely to be more cautious about supplying them with loans. We therefore explore how financial constraints affect the relation between timely loan loss recognition and firm debt structure.

We use three proxies for financial constraints, *Dividend payout* and *KZ index* following Kaplan and Zingales (1997) and *WW index* following Whited and Wu (2006). These three proxies are widely used in the prior literature to capture the level of firms' financial constraints. Firms that do not pay dividends are more likely to be financially constrained. For *KZ index* and

WW index, the larger the index, the larger the financial constraints. For each proxy, we separate our sample into financially constrained and unconstrained firms based on the sample median.

In Table 9, we find across all conditioning proxies, that the coefficient α_1 on *LLRT* is higher and statistically significant in the subsample of financially constrained firms (columns 2, 3, and 5), suggesting that financial constraints magnify firms' incentive to reduce their reliance on bank debt. The difference in the α_1 coefficient between the samples of constrained and unconstrained firms is statistically significant for the three firm-level financial constraints variables. This evidence is consistent with our predictions in H3 that the negative effect of *LLRT* on bank debt is more pronounced if borrowers are financially constrained.

<Insert Table 9 here>

5.3. Timely loan loss recognition, debt structure, and borrower opacity

We further examine whether the tighter loan conditions vary across borrowers with different levels of opacity. Borrower opacity is important since it shapes the firms' incentives to avoid monitoring. Prior studies find that opaque firms are subject to stricter monitoring from both shareholders and debtholders (Lin et al., 2012; Elyasiani and Zhang, 2015). Specifically, banks will be even more cautious in lending to opaque firms when there is more timely loan loss recognition and they will impose stricter monitoring on these firms since the likelihood of moral hazard problems and the risk of loan losses are higher. Managers in opaque firms would also try to avoid monitoring because the cost of preparing information to meet the monitoring requirements is higher. Therefore, our prediction is that the negative relation between timely loan loss recognition and bank debt is more pronounced for high opacity firms.

We consider three proxies for borrower opacity, *Analyst coverage*, *Volatility of earnings*, and *R&D*. *Analyst coverage* is defined as the number of analysts following the firm in the fiscal year. *Volatility of earnings* is defined as the standard deviation of earnings in the

past five years. *R&D* is defined as the proportion of R&D expenditure to total sales. The first two proxies measure corporate information opacity, while the last captures corporate operational opacity. The sample is separated into firms with high opacity (low analyst coverage, high earnings volatility, or high R&D) and those with low opacity (high analyst coverage, low earnings volatility, or low R&D) based on the sample median.

The results are presented in Table 10. Consistent with our prediction, we find that the negative relation between loan loss provision timeliness and reliance on bank debt is higher in opaque firms. Specifically, the magnitude of the coefficient on *LLRT*, α_1, is higher and statistically significant in the subsample of less transparent firms (columns 2, 3, and 5). The difference in the α_1 coefficients between the samples of transparent and opaque firms is statistically significant for the three firm-level opacity variables. This evidence is consistent with our fourth hypothesis that high opacity borrowers rely less on bank debt as a financing source.

<Insert Table 10 here >

7. Conclusion

The recognition of loan losses before actual default is an important element in the regulation of banks throughout the world. Bank regulators focus a great deal on ensuring that banks are monitoring for potential loan losses and recognizing these losses according to regulatory requirements. Naturally, banks are concerned about loan loss recognition because it affects their profitability and regulatory capital buffer. The issue of recognizing loan losses has become important, with efforts all over the world to encourage and even require more timely loan loss recognition. How regulatory accounting systems, particularly more timely loan loss recognition regimes, affect the debt contracting between banks and borrows is an interesting and important question.

In this paper, we examine how timely loan loss recognition in the banking system affects firms' debt structure. From the bank's perspective, more timely loan loss recognition creates lending constraints and requires greater monitoring of borrowers. From the borrowers' perspective, greater monitoring can impose costs that they might wish to avoid. Using an international sample of firms from 55 countries, we find that in banking systems with more timely recognition of loan losses, firms rely less on bank debt financing. This finding is consistent with more timely loan recognition creating tighter bank loan conditions, which results in a reduction in bank loan demand and supply. Our results are robust to alternative measures of the timeliness of loan loss provisions and alternative model specifications. After addressing endogeneity issues using a variety of methods, we continue to find a negative association between timely loan loss recognition and the use of bank debt in firms' debt structure.

We then run several cross-sectional analyses to examine whether more timely loan loss recognition reduces the use of bank debt via tighter loan conditions (e.g., more cautious lending and increased monitoring). First, we find the negative relation between timely loan loss recognition and the reliance on bank debt to be more pronounced in countries with stricter bank supervision. We further find that in the face of more timely loan loss recognition, financially constrained and opaque borrowers have a stronger reliance on public bonds than on private bank debt. Taken together, these cross-sectional analyses suggest that tighter loan conditions could be one channel that explains the lower reliance on bank debt in debt financing when there is more timely loan loss recognition. In an additional analysis using a sample of international loan contracts, we provide further evidence of a link between more timely loan loss recognition and banks giving borrowers less favorable loan terms. To the extent that such terms are symptomatic of the typical terms for actual and potential borrowers, one could understand why, ceteris paribus, borrowers in more timely loan loss recognition regimes rely less on bank debt.

Our paper offers insight into the real effects of loan loss recognition timeliness on the debt structure of firms around the world. As noted earlier, debt is an important source of capital in many countries, especially countries that are less developed. Prior studies, including survey papers on accounting research in the context of banking, highlight the importance of understanding the real effects of regulatory accounting systems (Kanodia and Sapra, 2016; Dou, Ryan, and Zou, 2018). While our findings suggest that one consequence of more timely loan loss recognition is a shift away from bank debt towards public bonds, our paper does not address the issue of whether such a shift is good or bad for banks, firms, and/or the broader economy. Forming a conclusion on this issue would be different from just documenting a shift, especially since prior studies detail the merits and drawbacks of each form of borrowing. However, given the international movement from an incurred loss model to an expected loan loss model, with the latter presumably leading to more timely loan loss recognition, we believe that our evidence of a shift in the debt structure in response to more timely loan loss recognition would be of interest of policymakers, banks, the underwriters of public bonds, firms, and other stakeholders.

Appendix

Variable definitions and sources

Variable	Definition	Source
Bank debt	Bank debt over total debt. Bank debt is defined as the sum of term loans and revolving credit and total debt is defined as the sum of all types of debt, including commercial paper, revolving credit, term loans, subordinated bonds and notes, senior bonds and notes, capital leases, and other debt.	Capital IQ
Public debt	Public debt over total debt. Public debt is defined as the sum of commercial paper, senior bonds and notes, and subordinated bonds and notes. Total debt is defined as the sum of all types of debt, including commercial paper, revolving credit, term loans, subordinated bonds and notes, senior bonds and notes, capital leases, and other debt.	Capital IQ
Debt maturity	The proportion of long-term debt due after the next three or five years to total debt.	Capital IQ
Debt security	The proportion of debt secured with collateral to total debt.	Capital IQ
LLRT	Timely loan loss recognition measure for each country year. Loan loss recognition is defined as the loan loss reserves at year *t* scaled by non-performing loans at time *t+1* for each bank. *LLRT* is the country-year average for all banks in each country in each year.	BankScope
LLRT1	Alternative measure of *LLR*, defined following Beatty and Liao (2011). Loan loss recognition is defined as the loan loss reserves at year *t* scaled by non-performing loans at time *t* for each bank. *LLR* is the country-year average for all banks in each country in each year.	BankScope
LLRT2	Alternative measure of *LLR*, defined following Bushman and Williams (2012), calculated as r_2 using Equation (2) if r_2 is statistically significant and zero otherwise.	BankScope
LLRT3	Alternative measure of *LLR*, defined following Akins et al. (2017), calculated as the weighted-average *LLR* using each bank's total loans as the weight.	BankScope
Size	Natural logarithm of total assets in US dollars (millions).	Capital IQ
Leverage	Sum of long-term debt and debt in current liabilities, divided by total assets	Capital IQ
Profitability	Income before extraordinary items divided by total assets.	Capital IQ
Tangibility	Total property, plant, and equipment divided by total assets.	Capital IQ
Tobin's Q	Sum of the market value of equity and the book value of debt, divided by total assets.	Capital IQ
Z-score	Altman's (1968) Z-score, calculated as (1.2*working capital + 1.4*retained earnings + 3.3*earnings before interest and taxes + 0.999*sales)/total assets + 0.6*(market value of equity/book value of debt).	Capital IQ
Dividend payout	Dummy variable that is equal to 1 for firms with dividend payouts and 0 otherwise.	Capital IQ

KZ index	-1.001909*CF_{it}+3.193193*$TLTD_{it}$ – 39.36780*$TDIV_{it}$ –1.314759*$CASH_{it}$ + 0.2826389*Q_{it}, where *CF* is cash flow divided by total assets, *TLTD* is long-term debt divided by total assets, *TDIV* is dividends divided by total assets, *CASH* is cash and short-term investment divided by total assets, and *Q* is Tobin's Q.	Capital IQ
WW index	-0.091*CF_{it}-0.062$DIVPOS_{it}$+0.021$TLTD_{it}$-0.044$LNTA_{it}$+0.102ISG_{it}-0.035SG_{it}, where *CF* is cash flow deflated by total assets, *DIVPOS* is an indicator equal to one if the firm pays cash dividends; *TLTD* is long-term debt deflated by total assets; *LNTA* is the natural logarithm of total assets, *ISG* is the firm's three-digit SIC industry sales growth, *SG* is firm sales growth.	Capital IQ
Volatility of earnings	Defined as the standard deviation of earnings in the past five years.	Capital IQ
R&D	Defined as the proportion of R&D expenditure to total sales.	Capital IQ
GDP	Natural logarithm of GDP per capita in constant 2005 US dollars.	World Bank
Private credit	Private credit by deposit money banks and other financial institutions deflated by GDP.	World Bank
Supervisory power	Country-level measure from Beck et al. (2006). The measure captures the extent to which a bank supervisory agency could help to improve banks' corporate governance.	Beck et al. (2006)
Private monitoring	Country-level measure from Beck et al. (2006). The measure captures the extent to which private creditors monitor banks through information sharing from official supervisory agencies.	Beck et al. (2006)
Government ownership in banks	Country-year-level measure that measures the percent of the banking system's assets in banks that are government controlled.	Bank Regulation and Supervision Survey (2012)
Analyst coverage	Defined as the number of analysts following the firm in the fiscal year.	IBES
Bank concentration	Country-year-level banking system measure, defined as the assets of the three largest banks as a share of the assets of all commercial banks.	Global financial development database (2015)
Bank access	Country-year-level banking system measure, defined using the number of commercial bank branches per 100,000 adults.	Global financial development database (2015)
Bank stability	Country-year-level banking system measure, defined using the bank z-score. It captures the probability of default for a country's commercial banking system. Z-score compares the buffer of a country's commercial banking system (capitalization and returns) with the volatility of those returns.	Global financial development database (2015)
Bank depth	Country-year-level banking system measure, defined as the ratio of central bank assets to GDP.	Global financial development database (2015)
Uncertainty avoidance	Country-level culture measure, based on answers from IBM managers from 1967 to 1973 in 40 countries. Uncertainty avoidance captures how residents in a country shun ambiguous situations and prefer predictable and interpretable situations.	Hofstede (1984, 2001)
Covenant	*Covenant* is the loan covenant intensity, which is the natural logarithm of 1 plus the total number of covenants in the loan facility a firm obtains.	DealScan
Spread	Spread is the all-in loan spread drawn in the DealScan database for a given loan facility. The all-in loan spread drawn is defined as the amount of loan	DealScan

	interest payment the borrower pays over *LIBOR*. *Spread* is the natural logarithm of the all-in spread drawn.	
Security	*Security* is a dummy variable that equals 1 if a loan that a firm obtains is secured by a collateral requirement and 0 otherwise.	DealScan
Cashholdings	Corporate cash holdings divided by total assets.	Capital IQ
ROA Volatility	The standard deviation of annual return on assets in the past three years.	Capital IQ
Sales Growth	Annual change in net revenue.	Capital IQ

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Table 1. Sample composition by country

Country	# firm-year	Percent	Country	# firm-year	Percent
Argentina	659	0.29	Luxembourg	313	0.14
Australia	6,982	3.1	Malaysia	9,369	4.16
Austria	722	0.32	Mauritius	63	0.03
Belgium	707	0.31	Mexico	1,014	0.45
Brazil	3,017	1.34	Netherlands	1,220	0.54
Canada	11,821	5.25	New Zealand	635	0.28
Chile	483	0.21	Norway	1,347	0.6
China	19,328	8.58	Pakistan	2,212	0.98
Colombia	113	0.05	Peru	866	0.38
Czech Republic	184	0.08	Philippines	756	0.34
Denmark	1,217	0.54	Poland	2,835	1.26
Egypt	476	0.21	Portugal	473	0.21
Finland	957	0.43	Republic of Korea	190	0.08
France	6,292	2.79	Russian Federation	1,002	0.45
Germany	5,961	2.65	Saudi Arabia	533	0.24
Greece	2,090	0.93	Singapore	4,533	2.01
Hong Kong	5,824	2.59	South Africa	1,829	0.81
Hungary	205	0.09	Spain	1,052	0.47
Iceland	239	0.11	Sweden	3,172	1.41
India	20,364	9.04	Switzerland	2,144	0.95
Indonesia	2,779	1.23	Thailand	4,354	1.93
Ireland	735	0.33	Turkey	1,746	0.78
Israel	2,384	1.06	United Arab Emirates	395	0.18
Italy	2,044	0.91	United Kingdom	11,405	5.07
Japan	28,488	12.65	United States of America	44,697	19.85
Jordan	456	0.2	Vietnam	1,370	0.61
Kuwait	575	0.26	Zambia	313	0.14
Latvia	213	0.09	**Total**	**225,153**	**100**

Note: This table presents the sample composition by country.

Table 2. Summary statistics

Panel A. Variable statistics

Variable	N	Mean	Std Dev	P25	Median	P75
Bank debt	225,153	0.679	0.384	0.35	0.893	1
LLRT	225,153	1.615	1.598	0.662	1.022	1.851
Tangibility	225,153	0.309	0.236	0.109	0.262	0.461
Leverage	225,153	0.172	0.188	0.028	0.117	0.252
Size	225,153	5.239	2.156	3.733	5.198	6.67
Profitability	225,153	0.052	0.195	0.031	0.083	0.135
Tobin's Q	225,153	1.697	1.76	0.898	1.174	1.762
Z-score	225,153	2.612	4.969	1.254	2.303	3.699
Private credit	225,153	91.259	42.177	52.623	99.615	117.123
GDP	225,153	9.857	1.277	8.925	10.617	10.77
Bank concentration	225,153	54.959	22.542	34.81	49.484	71.856

Panel B. Pearson correlation

	Bank debt	*LLRT*	*Tangibility*	*Leverage*	*Size*	*Profitability*	*Tobin's Q*	*Z-score*	*Private credit*	*GDP*	*Bank concentration*
Bank debt	1	-0.215	0.039	-0.126	-0.094	0.123	-0.121	0.061	0.118	-0.223	0.165
LLRT		1	-0.052	0.095	0.028	-0.098	0.139	-0.011	-0.196	0.228	-0.260
Tangibility			1	0.179	0.114	0.136	-0.092	-0.055	-0.074	-0.137	0.015
Leverage				1	0.069	-0.149	0.122	-0.344	-0.077	0.118	-0.082
Size					1	0.368	-0.155	0.154	0.090	0.161	0.003
Profitability						1	-0.312	0.455	-0.007	-0.138	0.033
Tobin's Q							1	0.230	-0.05	0.044	-0.026
Z-score								1	0.009	-0.097	0.051
Private credit									1	0.352	0.503
GDP										1	0.064
Bank concentration											1

Note: This table presents the summary statistics for bank debt and the control variables used in the main regression. Panel A presents the mean, median, standard deviation, and percentage distributions of the regression variables. Panel B presents the Pearson correlations for the sample.

Table 3. The effect of LLR timeliness on debt structure

	Bank debt	*Bank debt (OLS)*	*Bank debt (Tobit)*
	(1)	(2)	(3)
LLRT	-0.008***	-0.006***	-0.009***
	(-4.34)	(-3.70)	(-4.29)
Size		-0.031***	-0.0319***
		(-13.88)	(-11.93)
Leverage		0.020	0.0665***
		(1.57)	(3.78)
Profitability		0.187***	0.2341***
		(21.87)	(19.73)
Tangibility		0.056***	0.0650***
		(9.06)	(9.83)
Tobin's Q		-0.014***	-0.0171***
		(-9.06)	(-7.88)
Z-score		0.001	0.0004
		(1.09)	(0.48)
GDP		-0.062***	-0.0503**
		(-2.93)	(-2.24)
Private credit		-0.000*	-0.0005*
		(-1.94)	(-1.82)
Bank concentration		-0.000*	-0.0002*
		(-1.93)	(-1.70)
Country Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes
Cluster by country and year	Yes	Yes	Yes
N	225,153	225,153	225,153
Adj R^2	0.1879	0.2136	0.1792

Note: This table presents the regression results of the effect of LLR timeliness on debt structure. *, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively. The dependent variable is reliance on bank debt, defined as bank debt over total debt. Column (1) presents the results using only control variables. Column (2) presents the results using an OLS regression. Column (3) presents the results using a Tobit model. Country, year, and industry fixed effects are included in the model. Coefficient estimates and standard errors are reported based on robust standard errors clustered by country and by year.

Table 4. Alternative measures of LLR timeliness, debt structure, and capital structure

	LLRT1	*LLRT2*	*LLRT3*	*Public debt*	*Leverage*
	(1)	(2)	(3)	(4)	(5)
LLRT	-0.006***	-0.001***	-0.001***	0.008***	0.001
	(-3.68)	(-3.85)	(-4.45)	(5.32)	(0.33)
Size	-0.031***	-0.031***	-0.031***	0.043***	0.005***
	(-13.86)	(-13.98)	(-13.94)	(25.23)	(6.72)
Leverage	0.021	0.020	0.020	0.243***	
	(1.58)	(1.57)	(1.57)	(25.43)	
Profitability	0.186***	0.187***	0.187***	-0.097***	0.024**
	(21.79)	(21.90)	(21.94)	(-9.84)	(2.37)
Tangibility	0.056***	0.056***	0.056***	-0.074***	0.086***
	(9.07)	(9.08)	(9.08)	(-15.47)	(14.42)
Tobin's Q	-0.014***	-0.014***	-0.014***	0.013***	-0.014***
	(-9.08)	(-9.10)	(-9.09)	(12.63)	(-10.42)
Z-score	0.001	0.001	0.001	-0.005***	-0.011***
	(1.09)	(1.04)	(1.04)	(-11.60)	(-24.36)
GDP	-0.043*	-0.085***	-0.083***	-0.011	0.002
	(-1.84)	(-4.02)	(-3.97)	(-0.74)	(0.10)
Private credit	-0.000	-0.001***	-0.001**	0.001***	0.001***
	(-1.55)	(-2.68)	(-2.49)	(3.77)	(3.81)
Bank concentration	-0.000*	-0.000	-0.000	0.000	-0.000
	(-1.81)	(-0.69)	(-0.85)	(1.38)	(-0.56)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes
Cluster by country and year	Yes	Yes	Yes	Yes	Yes
N	225,153	225,153	225,153	225,153	225,153
Adj R^2	0.2137	0.2134	0.2134	0.3178	0.4322

Note: This table presents the results using public debt as the dependent variable and alternative measures of loan loss recognition. *, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively. In columns (1) - (3), the dependent variable is reliance on bank debt, defined as bank debt over total debt. *LLRT1* is LLR timeliness estimated as the average ratio of loan loss reserves to non-performing loans for each country-year (Beatty and Liao, 2011). *LLRT2* is LLR timeliness estimated following Bushman and Williams (2012). *LLRT3* is LLR timeliness estimated as the average ratio of loan loss reserves to next-year non-performing loans, weighted by the total loans outstanding, for each country year. In column (4), the dependent variable is reliance on public debt, *Public debt*, defined as public debt over total debt. In column (5), the dependent variable is *Leverage*, which is the sum of long-term and short-term debt divided by total assets. Country, year, and industry fixed effects are included in the model. Coefficient estimates and standard errors are reported based on robust standard errors clustered by country and by year.

Table 5. Alternative model specifications

	Country-year regression	Weighted-average regression	Excluding # firms top 3 countries	Excluding GDP/#firms top 3 countries	Excluding financial crisis period	Excluding undeveloped bond markets
	(1)	(2)	(3)	(4)	(5)	(6)
LLRT	-0.009***	-0.007***	-0.002***	-0.006***	-0.007***	-0.007***
	(-2.62)	(-3.90)	(-3.84)	(-3.61)	(-3.79)	(-3.81)
Size	-0.055***	-0.034***	-0.029***	-0.031***	-0.033***	-0.037***
	(-4.27)	(-10.70)	(-16.80)	(-13.84)	(-12.76)	(-22.68)
Leverage	-0.466***	0.033**	0.005	0.021	0.019	0.035***
	(-2.79)	(2.35)	(0.27)	(1.62)	(1.41)	(2.79)
Profitability	-0.193	0.175***	0.205***	0.186***	0.184***	0.193***
	(-0.84)	(20.98)	(15.80)	(21.80)	(21.53)	(21.51)
Tangibility	0.341***	0.056***	0.054***	0.055***	0.054***	0.047***
	(2.78)	(8.03)	(7.41)	(8.94)	(7.96)	(7.89)
Tobin's Q	0.041**	-0.018***	-0.008***	-0.014***	-0.014***	-0.016***
	(2.24)	(-10.19)	(-5.36)	(-9.17)	(-8.61)	(-9.96)
Z-score	-0.009	0.003***	-0.001**	0.001	0.001	0.001**
	(-1.06)	(3.06)	(-2.21)	(1.09)	(1.29)	(2.19)
GDP	0.114***	-0.097***	-0.005	-0.066***	-0.068***	-0.038*
	(3.81)	(-2.92)	(-0.29)	(-3.08)	(-2.69)	(-1.87)
Private credit	0.000	-0.001**	0.000	-0.000**	-0.001**	-0.000*
	(0.22)	(-2.43)	(1.42)	(-1.99)	(-2.33)	(-1.92)
Bank concentration	0.000	-0.000**	-0.000***	-0.000*	-0.000**	-0.000*
	(0.26)	(-2.19)	(-2.97)	(-1.81)	(-2.05)	(-1.96)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	No	Yes	Yes	Yes	Yes	Yes
Cluster by country and year	Yes	Yes	Yes	Yes	Yes	Yes
N	664	225,153	131,604	224,411	186,298	196,293
Adj R^2	0.7888	0.2913	0.1258	0.2136	0.2157	0.2242

Note: This table presents the results using alternative measures of loan loss recognition. *, **, and *** indicate statistical significance at the 0.1, 0.05, and 0.01 levels, respectively. The dependent variable is reliance on bank debt, defined as bank debt over total debt. Column (1) presents the results of the country-year-level regression. Column (2) presents the results of the weighted-average regression, using the number of country-year observations in each country-year as the weight. Column (3) presents the results excluding the top 3 countries with the largest number of observations. Column (4) presents the results excluding the top 3 countries with the largest number of GDP per capita to the number of firms in each country-year. Column (5) excludes the financial crisis period from the analysis. Column (6) exclude countries with an undeveloped bond market. Country, year, and industry fixed effects are included in the model. Coefficient estimates and standard errors are reported based on robust standard errors clustered by country and by year.

Table 6. Instrumental variable approach

	1st stage	2nd stage
	(1)	(2)
LLRT		-0.171***
		(-3.78)
Uncertainty avoidance	0.023***	
	(5.64)	
Size	0.006	-0.033***
	(0.62)	(-11.73)
Leverage	-0.025	0.027*
	(-0.31)	(1.92)
Profitability	-0.204***	0.159***
	(-3.87)	(3.52)
Tangibility	0.030	0.061***
	(0.60)	(7.08)
Tobin's Q	0.019**	-0.013***
	(1.99)	(-2.96)
Z-score	0.009***	0.003
	(3.81)	(1.22)
GDP	0.614***	-0.045
	(5.32)	(-0.32)
Private credit	-0.011***	-0.002
	(-3.85)	(-1.04)
Bank concentration	-0.018***	-0.003
	(-3.29)	(-0.81)
Country Fixed Effect	No	Yes
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes
Cluster by country and year	Yes	Yes
N	196,653	196,653
Adj R^2	0.4676	0.1936

Note: This table presents the results of the IV regressions. In the first stage regression, the dependent variable is LLR timeliness. The instrumental variable used in the first stage is *Uncertainty avoidance*, which is the country-level culture variable from Hofstede (2001). In the second stage, the dependent variable is reliance on bank debt, defined as bank debt over total debt. In the first stage, year, and industry fixed effects are included in the model. In the second stage, country, year, and industry fixed effects are included in the model. Coefficient estimates and standard errors are reported based on robust standard errors clustered by country and by year.

Table 7. Channel analysis: Test of costly monitoring avoidance

Panel A. Inclusion of loan supply variables

	Bank access	*Bank stability*	*Bank depth*	*All included*
	(1)	(2)	(3)	(4)
LLRT	-0.007***	-0.006***	-0.006***	-0.007***
	(-4.25)	(-3.32)	(-2.96)	(-4.20)
Size	-0.030***	-0.031***	-0.032***	-0.032***
	(-10.81)	(-13.36)	(-13.44)	(-10.81)
Leverage	0.028*	0.019	0.033**	0.040***
	(1.86)	(1.41)	(2.54)	(2.80)
Profitability	0.183***	0.184***	0.190***	0.186***
	(17.40)	(21.09)	(20.99)	(16.82)
Tangibility	0.054***	0.058***	0.054***	0.052***
	(7.30)	(9.12)	(8.62)	(6.69)
Tobin's Q	-0.015***	-0.014***	-0.014***	-0.015***
	(-9.27)	(-8.86)	(-7.91)	(-8.17)
Z-score	0.001	0.001	0.001	0.001
	(0.85)	(0.91)	(0.81)	(0.88)
GDP	-0.119***	-0.060**	-0.061**	-0.142***
	(-3.29)	(-2.47)	(-2.37)	(-4.28)
Private credit	-0.000**	-0.000*	-0.000*	-0.001***
	(-2.21)	(-1.78)	(-1.73)	(-3.53)
Bank concentration	-0.000	-0.000	-0.000*	0.000
	(-0.37)	(-1.17)	(-1.86)	(0.14)
Bank access	0.001***			0.002***
	(3.20)			(3.17)
Bank stability		-0.001		-0.001**
		(-1.48)		(-2.36)
Bank depth			0.001	-0.000
			(1.13)	(-0.37)
Country Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Cluster by country and year	Yes	Yes	Yes	Yes
N	162,248	204,225	191,688	147,533
Adj R^2	0.1963	0.2192	0.2266	0.2081

Panel B. The establishment of a public credit registry

	Bank debt
Post	-0.278***
	(-4.97)
LLRT	-0.319***
	(-5.11)
*Treat*LLRT*	0.354***
	(5.10)
*Post*LLRT*	0.313***
	(5.01)
*Treat*Post*	0.338***
	(5.61)
*Treat*Post*LLRT*	-0.329***
	(-4.72)
Size	-0.009**
	(-2.54)
Leverage	-0.309***
	(-10.91)
Profitability	0.101***
	(3.23)
Tangibility	0.102***
	(10.35)
Tobin's Q	-0.001
	(-0.48)
Z-score	-0.001
	(-1.07)
GDP	-0.235***
	(-8.91)
Private credit	-0.001**
	(-2.33)
Bank concentration	-0.000
	(-0.45)
Country Fixed Effect	Yes
Year Fixed Effect	Yes
Industry Fixed Effect	Yes
Cluster by country and year	Yes
N	29,904
Adj R^2	0.1334

Panel C. Loan loss recognition timeliness and loan contract terms

	Security	*Covenant*
	(1)	(2)
Intercept	0.900***	-0.147***
	(2.97)	(-4.06)
LLRT	0.005*	0.063***
	(1.69)	(10.02)
Size	-0.064***	0.012***
	(-34.60)	(3.32)
Leverage	0.347***	0.062**
	(17.90)	(2.46)
Profitability	-0.428***	0.087***
	(-11.27)	(3.64)
Tangibility	-0.044**	-0.021**
	(-2.38)	(-2.38)
Tobin's Q	-0.040***	-0.004***
	(-9.39)	(-2.72)
Z-score	0.004**	0.001***
	(2.28)	(3.10)
Cashholdings	0.008	-0.110***
	(0.24)	(-3.35)
ROA Volatility	0.711***	-0.063***
	(7.65)	(-3.53)
Sales Growth	0.032***	0.009**
	(3.21)	(2.42)
Country Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes
Cluster at country and year	Yes	Yes
N	18,858	19,591
Adj R^2	0.3178	0.2005

Note: This table presents the results that address the endogeneity issue. Panel A presents the results using additional country-year-level variables related to loan supply. Panel B presents the results of the difference-in-differences analysis. *Post* is defined as 1 for treatment firms after the country established a public credit registry and 0 otherwise. *Treat* is defined as 1 for countries with public credit registries and 0 for control firms. Control variables are as previously stated. Panel C presents the results of loan loss recognition timeliness and loan contract terms. *Security* is defined as whether or not the contract is secured with collateral. *Covenant* is defined as the loan covenant intensity. Country, year, and industry fixed effects are included in the model. Coefficient estimates and standard errors are reported based on robust standard errors clustered by country and by year.

Table 8. Cross-sectional variations on bank supervision

	Supervisory Power		*Private monitoring*		*Government Ownership in Banks*	
	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)
LLRT	-0.012***	0.001	-0.013***	0.003	0.008	-0.004**
	(-2.81)	(0.44)	(-4.91)	(0.80)	(1.26)	(-2.29)
Size	-0.047***	-0.024***	-0.047***	-0.014**	-0.018***	-0.038***
	(-24.74)	(-5.11)	(-27.81)	(-2.58)	(-4.32)	(-19.92)
Leverage	0.082***	-0.032	0.060***	-0.059**	-0.091***	0.054***
	(6.46)	(-1.50)	(4.71)	(-2.00)	(-4.53)	(4.09)
Profitability	0.188***	0.172***	0.193***	0.133***	0.113***	0.196***
	(19.25)	(11.77)	(22.30)	(5.86)	(5.56)	(19.57)
Tangibility	0.032***	0.095***	0.039***	0.111***	0.106***	0.040***
	(3.38)	(8.74)	(4.77)	(8.94)	(11.71)	(6.13)
Tobin's Q	-0.023***	-0.012***	-0.023***	-0.003	-0.001	-0.021***
	(-16.39)	(-5.94)	(-21.66)	(-1.44)	(-0.69)	(-16.83)
Z-score	0.005***	0.000	0.005***	-0.004***	-0.002***	0.002**
	(8.64)	(0.17)	(9.11)	(-3.30)	(-3.01)	(2.15)
GDP	0.003	-0.151***	-0.221**	-0.174***	0.026	-0.182***
	(0.03)	(-4.06)	(-2.02)	(-3.87)	(1.20)	(-3.37)
Private	-0.001*	0.001***	-0.000	-0.000	-0.001***	-0.000
	(-1.69)	(4.60)	(-0.34)	(-0.04)	(-3.06)	(-1.41)
Bank	0.000	-0.000	-0.000	0.000	-0.000**	-0.000
	(0.29)	(-0.88)	(-1.01)	(0.09)	(-2.13)	(-1.07)
Country	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Cluster by	Yes	Yes	Yes	Yes	Yes	Yes
N	67,481	60,970	81,129	47,322	80,055	138,936
Adj R^2	0.1986	0.09491	0.1830	0.05849	0.1134	0.2189
F-test for null hypothesis	Coefficient of *LLR* is the same for [1] and [2]		Coefficient of *LLR* is the same for [3] and [4]		Coefficient of *LLR* is the same for [5] and [6]	
p-value	[<.0001]		[<.0001]		[0.0130]	

Note: This table presents the results examining the role of supervisory power and private monitoring on the average effect of loan loss provisions on debt structure. *Supervisory power* is defined as whether the supervisory authorities have the authority to take specific actions to prevent and correct problems. *Private monitoring* index measures whether there are incentives and/or the ability to privately monitor firms, with higher values indicating more private monitoring. *Government ownership* is defined following the Bank Regulation and Supervision Survey from World Bank. Country, year, and industry fixed effects are included in the model. Coefficient estimates and standard errors are reported based on robust standard errors clustered by country and by year.

Table 9. Cross-sectional variation on borrower financial constraints

	Dividend payout		*KZ-Index*		*WW-Index*	
	With payout	No payout	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)
LLRT	0.003	-0.008***	-0.007***	-0.004*	-0.010***	-0.006**
	(1.01)	(-5.69)	(-3.21)	(-1.69)	(-5.27)	(-2.18)
Size	-0.044***	-0.031***	-0.036***	-0.038***	0.008***	-0.067***
	(-19.92)	(-11.22)	(-14.17)	(-17.14)	(3.29)	(-25.42)
Leverage	0.004	0.018	-0.007	0.033	0.001	0.035*
	(0.14)	(1.54)	(-0.59)	(1.17)	(0.07)	(1.67)
Profitability	-0.158***	0.179***	0.207***	0.081***	0.169***	0.099***
	(-5.81)	(21.16)	(18.17)	(3.86)	(17.13)	(3.05)
Tangibility	0.052***	0.057***	0.043***	0.057***	0.055***	0.033***
	(4.92)	(9.07)	(4.66)	(6.35)	(7.64)	(3.55)
Tobin's Q	0.013***	-0.014***	-0.014***	-0.007**	-0.007***	-0.016***
	(4.40)	(-7.76)	(-9.29)	(-2.28)	(-4.49)	(-4.79)
Z-score	-0.012***	0.001*	0.002***	-0.003**	-0.001	0.002*
	(-8.43)	(1.88)	(3.33)	(-2.26)	(-1.48)	(1.79)
GDP	-0.036	-0.073**	-0.071**	0.042	-0.064**	0.011
	(-1.12)	(-2.57)	(-2.23)	(1.60)	(-2.00)	(0.47)
Private credit	0.00	0.000	-0.001**	0.000	0.000	0.000
	(-1.28)	(-0.83)	(-2.12)	(-0.03)	(-0.39)	(-1.65)
Bank concentration	-0.001***	0.000	0.000	-0.000***	0.000	-0.001***
	(-3.85)	(-0.51)	(-0.36)	(-3.08)	(0.91)	(-4.76)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Cluster by country and year	Yes	Yes	Yes	Yes	Yes	Yes
N	69,647	155,588	78,067	78,067	78,276	78,275
Adj R^2	0.1179	0.2292	0.2788	0.1852	0.1812	0.3229
F-test for null hypothesis	Coefficient of *LLR* is the same for [1] and [2]		Coefficient of *LLR* is the same for [3] and [4]		Coefficient of *LLR* is the same for [5] and [6]	
p-value	[<.0001]		[0.0005]		[<.0001]	

Note: This table presents results that examine the role of financial constraints, on average, on the effect of LLR timeliness on debt structure. *Dividend payout* is a dummy variable that is equal to 1 for firms with dividends, 0 otherwise. *KZ-index* is calculated following Kaplan and Zingales (1997). *WW-Index* is calculated following Whited and Wu (2006). Country, year, and industry fixed effects are included in the model. Coefficient estimates and standard errors are reported based on robust standard errors clustered by country and by year.

Table 10. Cross-sectional variation on borrower opacity

	Analyst Coverage		*Volatility of Earnings*		*R&D*	
	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)
LLRT	0.004	-0.010***	-0.010***	-0.002	-0.007***	0.003
	(1.53)	(-7.51)	(-5.98)	(-0.96)	(-5.17)	(0.69)
Size	-0.053***	-0.031***	-0.030***	-0.052***	-0.034***	-0.041***
	(-30.28)	(-8.38)	(-13.75)	(-17.62)	(-12.98)	(-20.38)
Leverage	0.047**	0.033***	-0.002	0.027	0.037***	0.002
	(2.12)	(2.83)	(-0.16)	(1.22)	(3.06)	(0.08)
Profitability	0.212***	0.164***	0.151***	0.139***	0.169***	0.287***
	(10.75)	(14.94)	(13.84)	(4.20)	(16.41)	(10.56)
Tangibility	0.028***	0.045***	0.065***	0.016*	0.034***	0.071***
	(2.87)	(7.48)	(7.73)	(1.72)	(5.81)	(5.71)
Tobin's Q	-0.012***	-0.015***	-0.012***	-0.002	-0.015***	-0.006**
	(-5.87)	(-7.26)	(-7.37)	(-0.63)	(-7.98)	(-2.49)
Z-score	-0.002**	0.001	0.001	-0.004***	0.002*	-0.006***
	(-2.01)	(0.87)	(1.57)	(-2.96)	(1.94)	(-5.26)
GDP	-0.015	-0.036	-0.014	-0.010	-0.039*	-0.095***
	(-0.65)	(-1.59)	(-0.61)	(-0.43)	(-1.87)	(-2.90)
Private credit	-0.001**	0.000	0.000	-0.001***	-0.000**	-0.000
	(-2.33)	(0.60)	(0.88)	(-2.65)	(-1.97)	(-0.93)
Bank concentration	-0.001***	-0.000	0.000	-0.001***	-0.000**	-0.000
	(-4.60)	(-0.64)	(0.25)	(-3.13)	(-2.07)	(-0.98)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Cluster by country	Yes	Yes	Yes	Yes	Yes	Yes
N	67,541	123,270	75,299	78,611	147,426	43,901
Adj R^2	0.1605	0.2609	0.2037	0.2786	0.2437	0.1427
F-test for null hypothesis	Coefficient of *LLR* is the same for [1] and [2]		Coefficient of *LLR* is the same for [3] and [4]		Coefficient of *LLR* is the same for [5] and [6]	
p-value	[0.0010]		[0.0039]		[0.0117]	

Note: This table presents results that examine the role of borrowers' opacity in influencing the average effect of LLR timeliness on debt structure. *Analyst coverage* is defined as the number of analysts following the firm. *Volatility of earnings* is defined as the standard deviation of earnings over the year. *R&D* is defined as R&D to sales. Country, year, and industry fixed effects are included in the model. Coefficient estimates and standard errors are reported based on robust standard errors clustered by country and by year.